

Public Abstract

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Graduation Term:WS 2007

Department:Biological Sciences

Degree:MA

Title:Heterochrony of Floral and Mating System Characters Between *Nicotiana longiflora* and *N. plumbaginifolia*

Most flowering plants are hermaphroditic, with both sexes present in each flower. This allows for self-fertilization, or selfing. This phenomenon is found in many cereal grains, and is a common trait for invasive species. Much has been learned about selfing but the developmental mechanisms resulting in selfing are uncertain for many species. The goal of this research was to determine the mechanism of selfing, and the developmental differences between flowers for *Nicotiana longiflora* and *Nicotiana plumbaginifolia*. Automatic selfing is known to occur in *Nicotiana plumbaginifolia*, but is absent from its close relative *Nicotiana longiflora*, two species of wild tobacco from South America. *Nicotiana longiflora* has long white flowers while *Nicotiana plumbaginifolia* has much shorter flowers that look very similar. We collected seed from a group of these plants in Argentina that had three different flower lengths: long, medium and short. The floral characters related to selfing were measured for these plants as well as growth of the internal floral organs. The three flower length morphs were found to have different distance between anther and stigma, the male and female parts respectively. We also found differences in the growth rate of the floral organs with *Nicotiana longiflora* growing faster and resulting in smaller *Nicotiana plumbaginifolia* flowers. The medium flowers had the same growth rate as *Nicotiana longiflora* flowers but grew for a shorter period of time. In the selfing flowers the anthers opened letting out pollen when the anther and stigma were very close to touching. These results allow us to examine the genetics of selfing, by looking at the right traits, as well as show that there are different ways of achieving smaller flowers.